UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/675,693	09/30/2003	Hui-Ling Lou	MP0321	1055

26703 7590 03/28/2008

HARNESS, DICKEY & PIERCE P.L.C.
5445 CORPORATE DRIVE
SUITE 200
TROY, MI 48098

EXAMINER	
HA, DAC V	

ART UNIT	PAPER NUMBER
2611	

MAIL DATE	DELIVERY MODE
03/28/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/675,693	LOU ET AL.	
	Examiner	Art Unit	
	Dac V. Ha	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 December 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-95* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-91 and 95* is/are rejected.

7)☒ Claim(s) *92-94* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Applicant's arguments, see REMARKS, filed 12/27/07, with respect to the rejection(s) of claim(s) 1-95 under Claydon et al. in view of El-Gamal have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Onggosanusi et al. (US 2002/0196842) (hereafter Onggosanusi).

Claim Objections

2. Claims 61-72, 92-94 are objected to because of the following informalities:

Claim 61, line 4, "decoded" should be changed to "encoded".

Claims 92-94, the domain for the parameter "i" and "I" should be clearly defined. Appropriate correction is required.

Double Patenting

3. Claim 9 is objected to under 37 CFR 1.75 as being a substantial duplicate of claim 8. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

4. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct

from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

5. Claims 1, 17, 35, 47, 61, 73 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1 of U.S. Patent No. 7,133,473. Although the conflicting claims are not identical, they are not patentably distinct from each other because the claimed subject matter in claims 1, 17, 35, 47, 61, 73 would have been easily realized by one skilled in the art based on Patent No. 7,133,473. For example, claim 1 of the instant application calls for “demultiplexer” “that generates in-phase and quadrature components of said demodulated symbol sequence”. Such claimed subject matter would have been obvious to one skilled in the art as application specific. That is, when the received signal is of the type i.e. QAM modulated signal, such step would have been obvious at the receiving end.

This double patenting is being made FINAL.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 1-3, 10-13, 17-21, 26-31, 35-37, 40-43, 47, 48-52, 54-57, 61-63, 66-69, 74-76, 79-82, 89-91 , are rejected under 35 U.S.C. 103(a) as being unpatentable over Onggosanusi in view of Fang et al. (US 5,757,834) (hereafter Fang).

Re claim 1, Onggosanusi discloses:

“a demodulator that generates a demodulated symbol sequence by derotating a signal constellation of a received symbol sequence that is encoded bsed on a space-time block code” (Astract; Fig. 3, element 80; para. [0054], [0046], [0082]; claim 53.

Onggosanusi differs from the claimed invention in that Onggosanusi does not explicitly disclose:

“a dimension demultiplexer that communicates with said demodulator and that generates in-phase and quadrature components of said demodulated symbol sequence;

a branch metric computation module that communicates with said dimension demultiplexer and that generates branch metrics based on said in-phase and quadrature components.”

Onggosanusi discloses that many modulation techniques could be used (claim 25). In those situation (i.e. when PSK is used), one skilled in the art would have easily realized that a "demultiplexer" would be utilized for providing I and Q components as conventionally known (see Fang; col. 1, lines 48-56; Fig. 1, for example). Further, Onggosanusi discloses use of decoder (i.e. Viterbi) (para. [0061]). A person of ordinary skill in the art would have easily realized that a "branch metric computation" could be

part of the decoding process (see Fang, Fig. 1, 2, element 16). Therefore, in case PSK modulation is used, one skilled of ordinary skill in the art would have easily substituted the process for providing I and Q components and decoding process from Fang into Onggosanusi and still expect a predictable result.

Re claim 2, Fang further discloses “a Viterbi decoder … said branch metrics” in Fig. 2, element 15.

Re claim 3, Onggosanusi further discloses “wherein said demodulator … multiplying … system” in para. [0054].

Re claim 10, the claimed subject matter “wherein … space-time code” would have been easily realized by one skilled in the art as design specific.

Re claim 11, Onggosanusi further discloses “wherein said … 256-QAM code” in claim 25.

Re claim 12, the claimed subject matter “wherein … (WMAN)” would have been easily realized by one skilled in the art as application intend based on the wireless communication of Onggosanusi (para. [0003]).

Re claim 13, same analogy to that of claim 12 above applied.

Re claim 17, see claim 1 above for teaching of "generating a user data sequence based said received symbol sequence” and “a branch metric computation … received symbol sequence.” Onggosanusi also discloses “at least one receiving antenna that receives a received symbols sequence” in Fig. 4, element RAT; para. [0082]; and "a space-time block deocder that communicates with said at least one receiving antenna" in Fig. 4, element 110; claim 26.

Re claim 18, Onggosanusi further discloses the claimed subject matter “wherein … symbol sequence” in para. [0082], wherein element 104 is viewed as the decoder.

Re claim 19, Fang further discloses “wherein … quadrature components" in Fig. 2, element 10.

Re claim 20, see claim 3 above.

Re claim 21, see claims 2.

Re claim 26, Onggosanusi further discloses "a transmitter ... two transmit antennae" in Fig. 3, element 70.

Re claim 27, Onggosanusi further discloses "a transmitter ... two transmit antennae” in para. [0082].

Re claims 28-31, see claims 10-13 above, respectively.

Re claims 35, 61, see corresponding apparatus claim 1.

Re claims 36, 37, 40-43, see claims 2-3, 10-13 above, respectively.

Re claims 62-63, see claims 2, 3, respectively.

Re claims 66-69, see claims 10-13 above, respectively.

Re claims 47, 73, see corresponding apparatus claim 17.

Re claims 48-52, see claims 18-22, respectively.

Re claims 54-57, see claims 28-31, respectively.

Re claims 74, 75, 76, 79, 80, 81, 82, see claims 18, 20, 21, 28-31, respectively.

Re claim 89, Onggosanusi further discloses “wherein … antennas” in Fig. 3, para. [0082].

Re claims 90-91, these claimed subject matter would have been easily realized by one skilled the art through operation of the combination of space-time coding and Viterbi coding above.

8. Claims 4-9, 22-25, 38, 39, 53, 64, 65, 77, 78 are rejected under 35 U.S.C. 103(a) as being unpatentable over Onggosanusi in view of Fang as applied to claim 2 above, and further in view of Hemmati (US 6,680,986).

Re claim 4, the aforementioned combination teach almost all claimed subject matter in claim 4, as stated above, except "wherein said Viterbi decoder ... branch metrics". Even thought the aforementioned combination does not go into detail of a Viterbi decoder, operation of the Viterbi decoder is well-known in the art. Particularly, Hammati discloses the claimed subject matter "wherein ... branch metrics" in Fig. 5, 6; col. 6, lines 40-64. Therefore, it would have been obvious to one skilled in the art at the time of the invention to substitute the Viterbi decoder from Hemmati into the aforementioned combination and still provide a predictable result.

Re claim 5, Hemmati further discloses "wherein ... symbol sequence" in col. 6, lines 40-64; col. 7, lines 37-53; claims 4, 18.

Re claim 6, Hammati further disclose " one receive antenna" and "two transmit antennae" in para. 0082.

Re claim 7, the claimed subject matter "wherein said receive … symbol periods" would have been easily realized by one skilled in the art as design specific.

Re claims 8, 9, Hammati further disclose "two receive antennae" and "two transmit antennae" in para. 0082.

Re claims 22-25, see claims 4-7 above, respectively.

Re claims 38, 39, see claims 4, 5 above.

Re claim 53, see claim 23.

Re claims 64-65, see claims 4, 5 above.

Re claims 77, 78, see claims 22, 23, respectively.

9. Claims 14-16, 32-34, 44-46, 58, 60, 70-72, 83-85 are rejected under 35 U.S.C. 103(a) as being unpatentable over aforementioned combination of Onggosanusi and Fang as applied to claim 1 above, and further in view of Kandala et al. (US 6,977,972) (hereafter Kandala).

Re claim 14, the combination of Onggosanusi and Fang disclose almost all claimed subject matter in claim 14, as stated above, except for "wherein said … bit-interveaved". Kandala discloses Gray coding used for in-phase and quadrature component in col. 4, lines 18-53; and "bit-interleaved" in col. 3, lines 55-67. Therefore, it would have been obvious to one skilled in the art at the time of the invention to optionally apply the use of Gray coding and bit-interleaving from Kandala into the combination of Onggosanusi and Fang to further improve the performance of transmission channel (this benefit is well-known in the art of communication).

Re claims 15, 16, these claimed subject matter would have been easily realized by one skilled in the art as design and application specific based on the above combination.

Re claims 32-34, see claims 14-16, respectively.

Re claims 44-46, see claims 14-16, respectively.

Re claims 58-60, see claims 32-34, respectively.

Re claims 70-72, see claims 14-16, respectively.

Re claims 83-85, see claims 32-34, respectively.

10. Claims 86-88, 95 are rejected under 35 U.S.C. 103(a) as being unpatentable over combination of Onggosanusi and Fang as applied to claim 1 above, and further in view of Bevan et al. (US 6,891,897) (hereafter Bevan).

Re claim 86, the combination of Onggosanusi and Fang discloses almost all claimed subject matter in claim 86, as stated above, except for "wherein said received symbol sequence is encoded based on a space-time block code in concatenation with an outer code". However, in the same field of endeavor, Bevan discloses such claimed subject matter in Fig. 5(iv); Fig. 9; col. 18, lines 16-45. Therefore, it would have been obvious to one skilled in the art at the time of the invention to substitute the known coding technique from Bevan into the above combination, to provide another layer of coding to the signal as an option, and still provide a predictable result.

Re claim 87, the claimed subject matter "wherein … signal constellation" would have been well-known in the art of coding/modulation and would have been easily understood by one skilled in the art (see Al-Dhahir et al. - US 6,959,047; col. 3, line 17 to col. 10, line 3 for example, but not relied on for the rejection.)

Re claim 88, Onggosanusi further discloses "wherein … multiple antennas" in Fig. 3, para. [0082].

Re claim 95, see claim 86 above.

Allowable Subject Matter

11. Claims 92-94 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dac V. Ha whose telephone number is 571-272-3040. The examiner can normally be reached on 4/4.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Payne can be reached on 571-272-3024. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Dac V. Ha/
Primary Examiner, Art Unit 2611